

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A semiconductor device comprising:
 - a semiconductor substrate having a first conductivity type;
 - a first well having a second conductivity type formed in a first region in a major surface of the semiconductor substrate;
 - a first MOS transistor having the first conductivity type and a first contact region having the second conductivity type formed in the first well;
 - field oxide regions formed on a surface of the first well; and
 - a first heavily doped region of buried layer having the second conductivity type formed in the first well at a distance away from the first contact region and the field oxide regions, wherein the distance is greater than 0, wherein the first heavily doped region of buried layer prevents latch-up, wherein the first heavily doped region of buried layer does not extend under the first MOS transistor, and is not below a field oxide layer, and wherein said field oxide layer separates the first well and a second well.
2. (Currently Amended) The semiconductor device as claimed in claim 1, further comprising:

a second well having the first conductivity type formed in a second region in the major surface of the semiconductor substrate;

a second MOS transistor having the ~~second~~ first conductivity type and a second contact region having the second conductivity type formed in the second well; and

a second heavily doped region of buried layer having the first conductivity type formed between the second contact region in the second well and a surface of the second well on an opposite portion of the second well from the second contact region within the semiconductor substrate.

3. (Previously Presented) The semiconductor device as claimed in claim 2, wherein the junction depth of the first and second wells is 1.5 to 2.0 μm .

4. (Currently Amended) The semiconductor device as claimed in claim 2, wherein the concentration of the second heavily doped region ~~of buried layer having the first conductivity type~~ is higher than that of the second well and lower than that of the second contact region.

5-12. (Cancelled)

13. (Currently Amended) The semiconductor device as claimed in claim 1, ~~further comprising: a~~ wherein the second well ~~having~~ has a first conductivity type and is formed in a second region of the semiconductor substrate, wherein a second heavily doped region of buried layer having a first conductivity type is formed in the second well at a distance away from a second contact region and field oxide regions, wherein the distance is greater than 0.

14. (Currently Amended) The semiconductor device as claimed in claim 1, ~~further comprising: a~~ wherein the second well ~~having~~ has a first conductivity type and is formed in a second region of the semiconductor substrate; ~~and wherein a~~ second heavily doped region of buried layer having a first conductivity type is isolated within the second well and separated from boundaries that form the second well, wherein the distance between the second heavily doped region ~~having a first conductivity type~~ and the boundaries of the second well is greater than 0.

15. (Previously Presented) A semiconductor device, comprising:

- a semiconductor substrate;
- a first well having a second conductivity type formed in a first region of the semiconductor substrate;
- a second well having a first conductivity type formed in a second region of the semiconductor substrate;

field oxide regions formed on a surface of the second well, wherein a heavily doped region of buried layer having the first conductivity type is formed in the second well at a distance away from a second contact region and field oxide regions, wherein the distance is greater than 0; and

a heavily doped region of buried layer having a second conductivity type formed in the first well, wherein the heavily doped region is isolated within the first well and separated from boundaries that form the first well, wherein the distance between the heavily doped region and the boundaries that form the first well is greater than 0.

16. (Currently Amended) The semiconductor device as claimed in claim 15, further comprising:

field oxide regions formed on a surface of the first well, wherein the heavily doped region formed in the first well is formed at a distance away from ~~[[the]]~~ a first contact region and the field oxide regions, wherein the distance is greater than 0.

17. (Currently Amended) The semiconductor device as claimed in claim 15, ~~further comprising: a~~ wherein the heavily doped region of buried layer having a first conductivity type formed in the second well, ~~wherein the heavily doped region~~ is isolated within the second well and separated from boundaries that form the second well, wherein the distance between the heavily doped region and the boundaries that form the second well is greater than 0.

18. (Previously Presented) The semiconductor device as claimed in claim 17, wherein the concentration of the heavily doped region of buried layer having the first conductivity type is higher than that of the second well and lower than that of the second contact region.

19. (Previously Presented) The semiconductor device as claimed in claim 17, wherein the concentration of the heavily doped region of buried layer having the second conductivity type is higher than that of the first well and lower than that of the first contact region.

20. (Cancelled)

21. (Previously Presented) The semiconductor device as claimed in claim 15, wherein the heavily doped region of buried layer having a second conductivity type is formed not below a field oxide layer separating the first and second wells.

22. (Currently Amended) The semiconductor device as claimed in claim 15, ~~further comprising a heavily doped region of buried layer having the first conductivity type formed in the second well,~~ wherein the heavily doped region of buried layer having the first conductivity type is not formed below a field oxide layer separating the first and second wells.

23. (Previously Presented) The semiconductor device as claimed in claim 15, wherein the heavily doped region of the second conductivity type does not extend under a first MOS transistor in the first well.

24. (Previously Presented) A semiconductor device comprising:

- a semiconductor substrate having a first conductivity type;
- a first well having a second conductivity type formed in a first region of the semiconductor substrate;
- a second well having the first conductivity type formed in a second region of the semiconductor substrate;
- a field oxide layer formed on a portion of the semiconductor substrate where the first well and the second well contact one another;
- a heavily doped region of buried layer having the second conductivity type formed in the first well; and
- a heavily doped region of buried layer having the first conductivity type formed in the second well, wherein the heavily doped regions of buried layer of the first conductivity type, the second conductivity type, or the first and second conductivity type is/are not below the field oxide layer.

25. (Cancelled)

26. (Currently Amended) The semiconductor device as claimed in claim 1, wherein the first heavily doped region of buried layer is located within the first well isolated within the first well and separated from boundaries that form the first well, wherein the distance between the first heavily doped region in the first well and the boundaries of the first well is greater than 0.

27-28. (Cancelled)

29. (Currently Amended) The semiconductor device as claimed in claim 15, wherein each of the heavily doped ~~region~~ regions of buried layer prevents latch-up.

30. (Previously Presented) The semiconductor device as claimed in claim 24, wherein each of the buried layers are isolated within each well and separated from boundaries that form each well, wherein the distance between each of the buried layers and the boundaries of each of the wells is greater than 0.

31. (Previously Presented) The semiconductor device as claimed in claim 24, wherein each of the heavily doped regions of buried layer prevent latch-up.

32. (Previously Presented) The semiconductor device as claimed in claim 24, further comprising:

field oxide regions formed on a surface of the first well and/or the second well, wherein the heavily doped region formed in the first well and/or the second well is formed at a distance away from a first and/or a second contact region, respectively, and field regions, and wherein the distance is greater than 0.

33. (Currently Amended) The semiconductor device as claimed in claim 24, wherein at least one of the heavily doped regions of buried layer having a first conductivity type [[and/]]or second conductivity type is isolated within the second [[and/]]or the first well, respectively, and separated from boundaries that form the second well [[and/]]or the first well, respectively, wherein the distance between the heavily doped region having the first conductivity type and the boundaries of the second well is greater than 0 [[and/]]or the distance between the heavily doped region having the second conductivity type and the boundaries of the first well is greater than 0.

34. (Previously Presented) The semiconductor device as claimed in claim 24, wherein the heavily doped region having the second conductivity type is separated from a first contact region.

35. (Previously Presented) A semiconductor device, comprising:
- a semiconductor substrate having a first conductivity type;
 - a first well having a second conductivity type formed in a first region of the semiconductor substrate; and
 - a heavily doped region of buried layer formed in the first well having a second conductivity type, wherein the heavily doped region is separated from a first contact region, and wherein the heavily doped region does not extend under a first MOS transistor in the first well.
36. (Previously Presented) The semiconductor device as claimed in claim 35, further comprising:
- field oxide regions formed on a surface of the first well, wherein the heavily doped region formed in the first well is formed at a distance away from the first contact region and field oxide regions, wherein the distance is greater than 0.
37. (Previously Presented) The semiconductor device as claimed in claim 35, wherein the heavily doped region of buried layer is located within the first well, isolated within the first well and separated from boundaries that form the first well, wherein the distance between the heavily doped region in the first well and the boundaries of the first well is greater than 0.

38. (Previously Presented) The semiconductor device as claimed in claim 35, further comprising a second well in a second region of the semiconductor substrate, wherein the heavily doped region of buried layer formed in the first well having a second conductivity type is formed not below a field oxide layer separating the first well and a second well.

39. (Cancelled)

40. (Previously Presented) A semiconductor device, comprising:
a semiconductor substrate;
a first well having a second conductivity type formed in a first region of the semiconductor substrate;
a second well having a first conductivity type formed in a second region of the semiconductor substrate;
a heavily doped region of buried layer having a second conductivity type formed in the first well, wherein the heavily doped region is isolated within the first well and separated from boundaries that form the first well, wherein the distance between the heavily doped region and the boundaries that form the first well is greater than 0; and
a heavily doped region of buried layer having a first conductivity type formed in the second well, wherein the heavily doped region is isolated within the second well and

Serial No. 09/955,288

Docket No. LGS/S-0030A

Amendment Dated May 28, 2004

Reply to Office Action of March 2, 2004

separated from boundaries that form the second well, wherein the distance between the heavily doped region and the boundaries that form the second well is greater than 0.